WHAT IS CLAIMED IS

1. A crystal growth method, comprising the steps of:

a) supplying a nitrogen material into a reaction vessel in which a mixed molten liquid comprising an alkaline metal and a group-III metal; and

b) growing a crystal of a group-III nitride using the mixed molten liquid and the nitrogen material supplied in said step a) in said reaction vessel,

wherein a provision is made such as to cause a vapor of the alkaline metal to stay inside said reaction vessel.

2. A crystal growth method, comprising the steps of:

a) supplying a nitrogen material into a reaction vessel in which a mixed molten liquid comprising an alkaline metal and a group-III metal; and

b) growing a crystal of a group-III nitride using the mixed molten liquid and the nitrogen material brought in by said step a) in said reaction vessel,

wherein a provision is made such as to prevent a vapor of the alkaline metal from blocking a zone through which the nitrogen material is supplied from the outside of said reaction vessel.

3. The method as claimed in claim 2, wherein a temperature in said reaction vessel above the surface of the mixed molten liquid is controlled so as to prevent the vapor of the alkaline metal from condensing.

4. The method as claimed in claim 2, wherein the temperature of said zone is controlled.

5. The method as claimed in claim 1, wherein:

another reaction vessel is provided outside of said reaction vessel;

the nitrogen material is brought into the inner reaction vessel through the thus-provided outer reaction vessel; and

a provision is made such as to allow the nitrogen material to be brought into said inner reaction vessel from said outer reaction vessel, and, also, to cause the vapor of the alkaline metal to stay inside said inner reaction vessel.

6. The method as claimed in claim 2, wherein the nitrogen material is supplied horizontally or from a direction below the horizontal direction.

7. A crystal growth apparatus, comprising:

a reaction vessel holding a mixed molten liquid comprising an alkaline metal and a group-III metal;

a first heating device heating the mixed molten liquid so as to enable crystal growth therein; and

a second heating device heating above the surface of the mixed molten liquid so as to prevent the vapor of the alkaline metal above the surface of the mixed molten liquid from condensing.

8. A crystal growth apparatus comprising:

a reaction vessel holding a mixed molten liquid comprising an alkaline metal and a group-III metal; and

a heating device heating a zone through which a nitrogen material is supplied externally into said reaction vessel.

9. The apparatus as claimed in claim 7, wherein:

another reaction vessel is provided outside of

said reaction vessel;

the nitrogen material is brought into the inner reaction vessel through the thus-provided outer reaction vessel; and

a provision is made such as to allow the nitrogen material to be brought into said inner reaction vessel from said outer reaction vessel, and, also, to cause the vapor of the alkaline metal to stay inside said inner reaction vessel.

10. The apparatus as claimed in claim 8, wherein the nitrogen material is supplied horizontally or from a direction below the horizontal direction.

11. A crystal growth method comprising the steps of:

a) carrying out crystal growth in a reaction vessel of a group-III nitride comprising a group-III metal and a nitrogen from an alkaline metal, a

substance comprising the group-III metal, and a substance comprising the nitrogen; and

b) maintaining a growth condition for a crystal of the group-III nitride at a condition at which the crystal growth starts; then,

c) maintaining the growth condition at a condition at which the crystal growth stops; and, then,

d) again setting the condition at which the crystal growth starts.

12. The method as claimed in claim 11, wherein:

said step b) maintains the temperature of a zone in which a crystal of the group-III nitride grows at a temperature at which the crystal growth starts;

said step c) lowers the temperature of said zone to a temperature such that no alloy is formed between the group-III metal and another metal, and maintaining the temperature; and

said step d) increases the temperature to the temperature at which the crystal growth starts again.

13. The method as claimed in claim 12, wherein increase and decrease of the temperature are performed several times.

14. The method as claimed in claim 12, wherein the substance comprising the nitrogen in a form of a gas, and the gas is supplied into the reaction vessel continuously at a predetermined pressure.

15. The method as claimed in claim 12, wherein the substance comprising the group-III metal is additionally provided at the time the temperature is lowered.

16. The method as claimed in claim 11, wherein:

said step b) maintains an effective pressure of the substance comprising the nitride in a form a gas in a zone in which a crystal of the group-III nitride grows at a pressure at which the crystal growth starts;

said step c) lowers the effective pressure of the nitrogen gas in said zone to a pressure such that the crystal growth stops, and maintaining the pressure; and

said step d) increases the effective pressure of the nitrogen gas to the pressure at which the crystal growth starts again.

17. The method as claimed in claim 16, wherein increase and decrease of the effective pressure of the nitrogen gas are performed several times.

18. The method as claimed in claim 16, wherein the substance comprising the group-III metal is additionally provided at the time the effective pressure of the nitrogen gas is lowered.

19. A crystal growth apparatus comprising:

a reaction vessel in which crystal growth is performed of a group-III nitride comprising a group-III metal and a nitrogen from an alkaline metal, a substance comprising the group-III metal, and a substance comprising the nitrogen; and

a unit maintaining a growth condition for a crystal of the group-III nitride at a condition at which the crystal growth starts; then,

maintaining the growth condition at a condition at which the crystal growth stops; and, then,

again setting the condition at which the crystal growth starts.

20. The apparatus as claimed in claim 19, wherein said unit comprises a heating device heating a zone in which a crystal of the group-III nitride grows.

21. The apparatus as claimed in claim 19,

wherein said unit comprises a pressure control device controlling an effective pressure of the substance comprising the nitrogen in a form of a gas in a zone in which a crystal of the group-III nitride grows.

22. A crystal growth method, comprising the steps of:

a) forming a mixed molten liquid comprising an alkaline metal and a substance comprising a group-III metal in a liquid holding vessel;

b) growing in said liquid holding vessel a crystal of a group-III nitride comprising the group-III metal and nitride from the mixed molten liquid and a substance comprising the nitride;

c) creating a local concentration distribution of dissolved nitrogen in the mixed molten liquid in said liquid holding vessel during said step b).

23. The method as claimed in claim 22,

wherein said liquid holding vessel has an inner shape such as to create the local concentration distribution of the dissolved nitrogen in the mixed molten liquid.

24. The method as claimed in claim 23, wherein said inner shape of said liquid holding vessel is such that the cross sectional area becomes smaller downward.

25. The method as claimed in claim 23, wherein said inner shape of said liquid holding vessel is such that the cross sectional area is reduced partially.

26. The method as claimed in claim 23, wherein said inner shape of said liquid holding vessel

is such that the cross sectional area becomes smaller downward first, and, then, the cross sectional area is uniform downward from a mid height.

27. The method as claimed in claim 23, wherein said inner shape of said liquid holding vessel is such that the cross sectional area becomes smaller downward first, and, then, the cross sectional area becomes larger downward from a mid height.

28. A crystal growth apparatus, comprising:

a liquid holding vessel in which a mixed molten liquid comprising an alkaline metal and a substance comprising a group-III metal is formed; and

a unit growing in said liquid holding vessel a crystal of a group-III nitride comprising the group-III metal and nitride from the mixed molten liquid and a substance comprising the nitride,

wherein said liquid holding vessel has an

inner shape such as to create a local concentration distribution of dissolved nitrogen in the mixed molten liquid.

29. The apparatus as claimed in claim 28, wherein said inner shape of said liquid holding vessel is such that the cross sectional area becomes smaller downward.

30. The apparatus as claimed in claim 28, wherein said inner shape of said liquid holding vessel is such that the cross sectional area is reduced partially.

31. The apparatus as claimed in claim 28, wherein said inner shape of said liquid holding vessel

is such that the cross sectional area becomes smaller downward first, and, then, the cross sectional area is uniform downward from the mid level.

32. The apparatus as claimed in claim 28, wherein said inner shape of said liquid holding vessel is such that the cross sectional area becomes smaller downward first, and, then, the cross sectional area becomes larger downward from the mid level.

33. The apparatus as claimed in claim 28, wherein said unit comprises a heating device heating the temperature inside said liquid holding vessel so as to enable the crystal growth therein.

34. The apparatus as claimed in claim 31,

wherein said unit comprises a plurality of heating devices for creating a predetermined temperature difference between an upper part and a lower part of said liquid holding vessel.

35. A group-III nitride crystal formed in accordance with the crystal growth method claimed in claim 1.

36. A group-III nitride crystal formed in accordance with the crystal growth method claimed in claim 2.

37. A group-III nitride crystal formed by the crystal growth apparatus claimed in claim 7.

38. A group-III nitride crystal formed by the crystal growth apparatus claimed in claim 8.

39. A group-III nitride crystal formed in accordance with the crystal growth method claimed in claim 11.

40. A group-III nitride crystal formed by the crystal growth apparatus claimed in claim 19.

41. A group-III nitride crystal formed in accordance with the crystal growth method claimed in claim 22.

42. A group-III nitride crystal formed by the crystal growth apparatus claimed in claim 28.

43. A semiconductor device produced employing the group-III nitride crystal claimed in claim 35.

44. A semiconductor device produced employing the group-III nitride crystal claimed in claim 36.

45. A semiconductor device produced employing the group-III nitride crystal claimed in claim 37.

46. A semiconductor device produced employing

the group-III nitride crystal claimed in claim 38.

47. A semiconductor device produced employing the group-III nitride crystal claimed in claim 39.

48. A semiconductor device produced employing the group-III nitride crystal claimed in claim 40.

49. A semiconductor device produced employing the group-III nitride crystal claimed in claim 41.

50. A semiconductor device produced employing the group-III nitride crystal claimed in claim 42.

51. The semiconductor device as claimed in claim 43, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

52. The semiconductor device as claimed in claim 44, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

53. The semiconductor device as claimed in claim 45, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

54. The semiconductor device as claimed in claim 46, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

55. The semiconductor device as claimed in claim 47, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

56. The semiconductor device as claimed in claim 48, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

57. The semiconductor device as claimed in claim 49, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.

58. The semiconductor device as claimed in claim 50, wherein said device comprises a light-emission diode emitting light of a wavelength shorter than 400 nm.